RUST GEOTECH INC.

Spectral Gamma-Ray Borehole
Log Data Report

Borehole 51-18-09

Log Event A

Borehole Information

Farm : TX	**Tank :** TX-118	**Site Number :** 299-W15-183
N-Coord : 42,054	**W-Coord :** 76,001	**TOC Elevation :** 668.24
Water Level, ft :	**Date Drilled :** 4/8/1974	

Casing Record

Type : Steel-welded	Thickness : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 100	

Borehole Notes:
This borehole was drilled in April 1974 and was completed to a depth of 100 ft with 5-in.-nominal-diameter carbon-steel casing. The drill struck concrete at a depth of 32 ft; it was concluded by the drillers that the concrete was not part of the tank structure and the drilling continued.

The driller's log does not indicate that the casing was perforated. There is no indication that the bottom of the borehole was cemented or that any interval of the borehole was grouted.

The casing thickness is presumed to be 0.280 in., on the basis of published thickness for schedule-40, 6-in. steel casing.

The top of the casing is the starting depth for the logs. The lip of the casing is about even with the ground surface and other borehole collars in the vicinity.

Equipment Information

Logging System : 1	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 04/1996	**Calibration Reference :** GJPO-HAN-5	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number : 1	**Log Run Date :** 4/29/1996	**Logging Engineer:** Mike Widdop
Start Depth, ft.: 99.5	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 0.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

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Analysis Information

Analyst : H.D. Mac Lean

Data Processing Reference : P-GJPO-1787 Analysis Date : 1/24/1997

Analysis Notes :

The SGLS log of this borehole was completed in a single logging run. The pre-survey field verification spectra did not meet the acceptance criteria established for the peak shape and system efficiency. A nonconformance report issued in August 1996 (N-96-05) identified the cause of this failure to be a power supply malfunction that resulted in a low detector bias voltage being supplied to the logging tool. This malfunction occurred in the mornings immediately following system start-up, but ceased after an abnormally long warm-up period (about 1 to 2 hours). The nonconformance report also documents that radionuclide concentrations calculated from data collected within the first 2 hours of logging could be systematically underestimated by as much as 10 percent. Therefore, the data from the bottom 30 ft of the log (70 ft to 99.5 ft) may show a minor repeatability problem if the borehole is relogged in the future.

The post-survey field verification spectra met the acceptance criteria established for the peak shape and system efficiency, indicating that the logging system was operating within prescribed specifications after an initial warm-up period. The energy calibration and peak-shape calibration from the post-survey verification spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging operation. The gain remained stable throughout the data collection activity; it was not neccessary to apply corrections for gain drift in order to maintain proper peak identification.

Casing correction factors for a 0.280-in.-thick steel casing were applied during analysis.

The only man-made radionuclide encountered during the survey was Cs-137. Cs-137 was detected continuously between the ground surface and 13 ft, 15 and 15.5 ft, and 23 ft. Detectable quantities of Cs-137 were also measured at the 24-ft depth and at the bottom of the borehole.

The maximum measured Cs-137 concentration (about 2 pCi/g) was detected within the near-surface zone of continuous contamination at a depth of 2.5 ft. The measured Cs-137 concentrations elsewhere in the borehole (below a depth of 11 ft) were less than 1 pCi/g.

A step-like increase in the K-40 concentration and in the total gamma-ray count rate was detected at a depth of 47 ft. Measured concentrations were about 12 pCi/g above 49 ft and about 18 pCi/g below this depth. The KUT concentrations increase slightly at a depth of about 94 ft.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank TX-118.

Log Plot Notes:

Separate log plots show the concentrations of the man-made (Cs-137) and the naturally occurring radionuclides (KUT). The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest

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concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, in addition to the total gamma derived from the spectral data and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.